Federal

Federal Program: ENDANGERED SPECIES-WILDLIFE DIVERSITY
USFWS Region 3 - Section 6 Funds
Illinois Department of Natural Resources - Office of Resource Conservation

GRANT PROPOSAL

Project Title: Non-lethal population monitoring of the Endangered Illinois Cave Amphipod Gammarus acherondytes

Principal Investigator & Grantee Name: Julian J. Lewis, Ph.D.
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Funding Request: $20,400.00 total

Duration of Project: This project is scheduled for two to three years starting in the fall of 2006 and most likely continuing through 2009. Site visits will be made by qualified researchers and non-lethal sampling/censusing will occur. Data entry, analyses, and completing of final reports will be conducted in late 2008 through 2009.

A. **Project Justification:** The Illinois Cave Amphipod (Gammarus acherondytes) is a crustacean listed on the federal list of endangered species. This species was described by Hubricht & Mackin (1940) from specimens collected by Leslie Hubricht from Morrison's Cave (Illinois Caverns) and Stemler Cave in the karst of southwestern Illinois. Bousfield (1958) redescribed the species but added no new localities. Based on their collections Peck & Lewis (1978) added Fogelpole, Krueger/Dry Run and Pautler caves to the list of localities from which this amphipod was known. In 1976 J. Lewis visited Illinois Caverns and Stemler Cave to evaluate the sites for the Illinois Natural Areas Inventory. The cave communities were inspected and appeared intact at that time.

Over the next 20 years the land use of the area began to change from primarily agricultural and second growth forest into a region with an increasing suburban component. Webb (1995) reported that G. acherondytes could no longer be found in Stemler Cave and only small numbers of the amphipods were present in the other sites (Pautler Cave was reportedly closed by the owner). Fueled by the growing interest in G. acherondytes, The Nature Conservancy conducted a bioinventory of caves in Monroe and St. Clair counties (Lewis, Moss & Tecic 1999; Lewis et al. 2003). This project resulted in the report of six additional caves with populations of G. acherondytes. In 1999 Gammarus acherondytes was added to the U.S. Endangered Species List.

The Illinois Cave Amphipod thus survives in only a few caves in the sinkhole plain region of Monroe County. The population in Stemler Cave has been extirpated, presumed to be a victim of the suburbanization of the greater St. Louis metro area. With it went one third of the range of the species as well as perhaps a significant piece of its genetic diversity. Several, if not all, of the caves inhabited by the Illinois Cave

Amphipod are in a state of transition as land management changes. Episodic pollution events have created significant negative changes in populations. On a brighter note, surface habitat restoration at Illinois Caverns by IDNR moves forward with the possibility of groundwater habitat improvement.

In the sinkhole plain karst of western Illinois the land management, underground habitat and cave animal communities are in a constant state of flux. For this reason the recovery plan for the Illinois Cave Amphipod required yearly monitoring. This has not been done and was last performed in 2003. Proposed is a census of populations in all groundwater basins where the Illinois Cave Amphipod was known to survive when last monitored. By the time this project commences four years will have elapsed from the last time the status of this endangered species was evaluated.

B. **Project Objective:** Evaluation of the status of the endangered Illinois Cave Amphipod by non-lethal censusing of a population in each of the eight known groundwater basins: (1) Fogelpole Cave; (2) Illinois Caverns; (3) Spider Cave; (4) Pautler Cave; (5) Reverse Stream cave; (6) Frog Cave; (7) Snow White Cave; and (8) Rick's Pit. For each site changes in surface land use above the cave as well as the condition of the cave habitat will be re-evaluated as compared to that present in 2003. The data compiled will be used in side-by-side comparisons of past data to establish a snapshot of the status of the Illinois Cave Amphipod.

C. **Expected Results and/or Benefits:** The status of the Illinois Cave Amphipod can only be evaluated through monitoring. The present study will make it possible to assess the condition of the amphipod, its community, the cave habitat and the overlying land usage. Re-establishment of contact with landowners at the sites will demonstrate a continued interest in the species and caves that it inhabits. This work is the foundation for management of this endangered species.

D. **Project Approach:** In 2000 a method was developed for making population estimates of the species constituents of cave stream communities containing the Illinois Cave Amphipod. At that time the method was developed and non-lethal censusing was performed in selected caves. In brief, census transects were established and samples were removed from the stream from randomly selected quadrats. All animals in the samples were identified to species (there are about 10 species that regularly occur in cave streams in Monroe County) and then returned immediately to the stream. In 2001 the non-lethal censusing method was used to pursue the goals stated by the Gammarus acherondytes recovery plan necessary for population monitoring. In 2003 comprehensive, range-wide population estimates were conducted. In addition, census

transects were mapped in detailed at each site at that time in preparation for long-term monitoring. The proposed project will be the first time that comparative censusing is performed using the long-term monitoring protocol established in 2003. The transects established in all caves in 2003 will be visited (at several sites this is dependent on owner permission) and censussed. All animals will be identified, measured and returned to the stream.

E. Project Location(s): Proposed for the year 2006-2008 is to perform non-lethal censusing of a population in each of the eight known groundwater basins: (1) Fogelpole Cave; (2) Illinois Caverns; (3) Spider Cave; (4) Pautler Cave; (5) Reverse Stream cave; (6) Frog Cave; (7) Snow White Cave; and (8) Rick's Pit. Censusing at most sites is owner permission dependent.

F. Estimated Cost/Budget:

Budget

Personnel	
Principal Investigator	11,200.00
Field Assistant	4,400.00
Equipment and Supplies	750.00
Mileage	1,820.00
Per Diem	480.00
Lodging	800.00
Office expense	950.00
TOTAL:	$20,400.00 ✓

G. Illinois DNR Personnel: Joseph Kath and Diane Tecic with the Illinois DNR-Office of Resource Conservation will serve as the state project leaders and will be coordinating with other IDNR employees on this project.

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H. References:

Bousfield, E.L. 1958. Fresh-water amphipod crustaceans of glaciated North America. Canadian Field Naturalist, 72 (2): 55-113.

Hubricht, Leslie and J.G. Mackin. 1940. Descriptions of 9 new species of freshwater amphipod crustaceans, with notes and new localities for other species. American Midland Naturalist, 23: 187-218.

Lewis, Julian J., Moss, Philip and Diane Tecic. 1999. A conservation-focused evaluation of the imperiled troglobitic fauna of the sinkhole plain karst of southwestern Illinois. Unpublished report, The Nature Conservancy, 97 pages.

Lewis, Julian J., Philip Moss, Diane Tecic and Matt Nelson. 2003. A Conservation focused inventory of the subterranean invertebrates of the southwestern Illinois karst. Journal of Cave and Karst Studies 65: 9-21.

Peck, Stewart B. and Julian J. Lewis. 1978. Zoogeography and evolution of the subterranean invertebrates of Illinois and southeastern Missouri. National Speleological Society Bulletin, 40 (2): 39-63.

Webb, Donald. 1995. Status report on the cave amphipod Gammarus acherondytes Hubricht and Mackin (Crustacea: Amphipoda) in Illinois. Illinois Natural History Survey, Technical Report 1995 (22): 22 pages.